



Legal practices and challenges in addressing climate change and its impact on the oceans—A Chinese perspective

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ABSTRACT

Two key drivers, ocean warming and ocean acidification, affect the oceans and adds to the climate change adversely. International legal and policy instruments contain certain measures to tackle these growing effects. China is also committed to addressing the effects of climate change on the oceans. The overlapping of different systems has, however, created some difficulties in practice and further coordination is urgently required. This paper uses qualitative methods to investigate China's legal practices in addressing the effects of climate change and their impact on the oceans. The study considers newly introduced policies and recent actions launched by the Chinese Government to chart a clearer picture of the current practices. To this end, it is concluded that the ultimate solution in avoiding the worsening effects of climate change on the oceans would be to reduce the emission of greenhouse gases worldwide, and China aims to take advantage of playing leading role in such efforts.

1. Introduction

Many of the people and communities derive their living from the oceans worldwide [1]. Climate change and its impact on the oceans, however, indicates that future generations, particularly those of small island States, may no longer be able to grow up there in a sustainable fashion [2]. The reality would appear to be that; such people may become homeless or alternatively, have to emigrate from these islands due to the growing impact of rising sea levels [3]. It would have a psychological as well as cultural impact on communities living around coastal areas, and forces international legal instruments to focus on possible changes in legal strategies to address these issues accordingly [4]. Latitudes, ocean currents, wind and air masses, elevation, relief or shape of the land, and the proximity to water are the six key factors that are indicative of current global oceanic climate change [5]. Furthermore, greenhouse gases (hereinafter GHG) also adds in climate change. It results from the additional natural sun energy that arises from the increased heat in the oceans, which causes rising sea levels and intensifying sea surface temperatures [6]. The diversified ocean currents and temperatures due to global climate change, influence climate patterns worldwide [7]. The aforementioned situation is resulting in shrinkage of glaciers, earlier melting of ice on lakes and rivers, animal species are moving, and tree and plant species have also been affected

[8]. The scientific predictions regarding the effects of global climate change over the oceans are now frequently in evidence, e.g. raised sea levels, loss of sea and river ice, and powerful tsunamis and heat waves [9].

The result of the above-mentioned would seem to indicate that it is now right time to establish a unique, 'fire alarm system', which may encourage global legal instruments to seek relevant and unified international agreement in this regard. The existing relevant international agreements include the UN Framework Convention on Climate Change (hereinafter UNFCCC) [10], the Kyoto Protocol [11], the UN Convention on the Law of the Sea (hereinafter UNCLOS) [12], and the UN Convention on Biological Diversity (hereinafter UNCBD) [13]. These treaties could direct stakeholders for pushing the governments to draft and execute the required action plans [14]. The current situation is likely to create wide-spread vulnerability because the resultant harm from climate change is not limited to any State or a region but may threaten the whole world and its oceans.

The issue of ocean acidification was not mentioned in UNCBD and UNCLOS. However, its focus was certainly prompted concerns over ocean acidification, which has been discussed in conferences at various levels to encourage the monitoring of on-going ocean acidification situation. In addition, there is an encouragement to specifically value and protect the rights and responsibilities of all the stakeholders involved in

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safeguarding the oceans [15]. The 2008 Monaco Declaration [16], approved by 155 foremost ocean acidification researchers from 26 States revealed the fact that there is no specific international law pertaining to ocean acidification or its effects on marine heritage resources [17]. The existing international treaties related to marine resources are limited to catering for CO₂ emission, for which, there is a need to raise a call for collective global action and climate change mitigation regarding ocean acidification [18]. The declaration also provided certain findings such as that, ocean acidification is on-going, increasing the climate damage ratio and has socioeconomic impact, a detectable and rapid process which is growing, and that recovery is slow and all of this can only be controlled by managing atmospheric CO₂ levels in the future [19]. There is a need to address the issue of climate change and ocean acidification as a whole rather than as two separate matters. Efforts should be made to urge new international policy, specifically designed to tackle the global threats posed by ocean acidification and climate change [20].

Articles 194 and 207 of UNCLOS include the statements that the parties to UNCLOS must reduce, prevent, and control pollution of the oceanic atmosphere [21]. It is a matter of fact that these provisions did not specifically include ocean acidification but in combination with provisions for liability, responsibility and compensation as well as a remedy to the legal system in every State. This may provide some opportunities to encourage the parties in addressing the issue of ocean acidification [22]. The International Maritime Organisation agreements on marine pollution, MARPOL [23] and the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (hereinafter London Convention) [24] and its Protocol [25], have quite narrowly focussed on emitting, dumping and the discharge of ocean-going vessels, which is inadequate in terms of addressing the core issues of ocean acidification. UNFCCC and its Kyoto Protocol are, however, the key vehicles in addressing the issues relating to climate change [26].

In June 2017, an ocean conference was held in New York city by the United Nations, which aimed to convene in an island State, namely, 'Fiji', which was facing declining fish stocks, dying coral reefs, rising sea levels, and beaches overflowing with plastic [27]. The participants raised their grievances regarding the threats to marine health and focussed on the issues of plastic pollution, overfishing, combating climate change, in order to protect the high seas at the world wide [28]. The main purpose of the conference was to stimulate the action to enforce Sustainable Development Goal 14 (SDG 14), as 193 member States of the United Nations had adopted it in 2015 in pursuing a significant reduction in ocean pollution by 2025, sustainable management of coastal, marine and ecosystems and fisheries resources as well as diminishing the influence of ocean acidification resulting from climate change [29].

The synergies between UNFCCC and UNCLOS reflect that there is a lack of recognition and weak legal coordination between these two bodies. It is also important to note that the oceans have limited the excessive warming of the atmosphere by absorbing almost 93% increase in global warming since 1970 [30]. The legal provisions pertaining to the oceans represent minuscule importance in the various international legal instruments, which demonstrates the former's limited scope in terms of global climate change. The Paris Agreement [31], adopted on the 12th December 2015, is an example of the current limited impact of instruments as it is based on general objectives as well as on voluntary contributions. It does not, however, establish specific commitments or obligations towards the issue of ocean acidification. The result is that the oceans are still inadequately legally protected, despite the expected benefits of legal obligatory provisions and its legal acknowledgement, as contained in the document [32].

Based on the above facts, this paper intends to investigate the legal practices in China in addressing the effects of climate change and its impact on the oceans worldwide. Various policies and recent actions by the Chinese Government have also been considered and discussed in this study. The finding of this research concludes that a series of

measures in terms of legislation, policies, and actions have been imposed by the Chinese Government in addressing the issues of ocean acidification. The result is that China indicates a positive attitude toward the core issues and aims to play a leading role in combating the impact of climate change.

2. China's legal practices in addressing climate change and its impact on the oceans

The issue of universal climate change and its impact on the oceans is a collective legal obligation to the oceanic States that demands international legal cooperation to cope with the worsening effects. China demonstrates to continue with an aim of being fully responsible for negotiating conventions on climate governance as well as prevention and the control of marine pollution. In addition, China has also enacted a series of relevant laws at the domestic level, in performance of its obligations established by international treaties in addressing the effects of climate change and its impact on the oceans.

2.1. Ratified and fulfilled conventions concerning international climate governance

UNFCCC is the global legal platform regarding the issues concerning climate change [33]. The role of oceans in mitigating GHG emissions has been recognised in UNFCCC [34] and the importance of ensuring the integrity of all ecosystems including oceans, when taking action to tackle the issues of climate change [35]. China signed UNFCCC in June 1992 and formally ratified the Convention by the Standing Committee of the National People's Congress [36]. The *Kyoto Protocol* was adopted on 11th December 1997 focussing on how to implement the goals set forth in UNFCCC, and transforming the soft international obligations into legally binding force [37]. China has ratified the *Kyoto Protocol* in September 2002 [38]. The Clean Development Mechanism (CDM), established by the *Kyoto Protocol*, is a cooperative mechanism for GHG emission reduction between developed and developing countries. In response, China enacted the *Measures for the Operation and Management of the Clean Development Mechanism Project* in October 2005 [39], which was revised later in August 2011 [40]. At present, China holds a large share of the international CDM market. The *Kyoto Protocol* adopted the market-oriented mechanism in international climate governance. China also introduced a market-oriented mechanism in its environmental legislation, policy documents, and has conducted relevant actions in combating climate change. In December 2015, 195 parties to UNFCCC agreed to adopt the *Paris Agreement*, which forms a global action plan for tackling climate change after 2020 [41]. In April 2016, China became among the first-batch States to sign the *Paris Agreement*. In September 2016, China held a ceremony in the city of Hangzhou to deposit the legal instruments ratifying the *Paris Agreement* [42]. The Agreement entered into force on 4th November 2016, which means that the time-consuming debate has been transformed into practical action to reduce GHG emissions. Given the fact that China is the largest GHG emitter in the world, the *Paris Agreement* is bound to have a profound impact on China's environmental policies and management including climate governance and marine environmental protection [43].

As a party to UNFCCC, the *Kyoto Protocol*, and the *Paris Agreement*, China has formulated a series of laws to combat the effects of climate change and their impact on the oceans by means of the legal framework provided by these treaties. The fundamental law in the field of atmospheric environmental governance is the *Atmospheric Pollution Prevention and Control Law of the People's Republic of China*. This law was enacted in 1987 and it has been revised in 1995, 2000 and 2015, respectively. The law (2015 Revision) stipulates the standards, statistics, monitoring, and low-carbon technology of GHG emissions. It introduces a market-oriented mechanism in climate governance, and proposes China to gradually introduce the pilot projects for carbon emissions trading [44]. Also, China has been actively promoting a legislative

process to cope with the issues of climate change. In 2016, the *Climate Change Law* and the *Regulations on Carbon Emissions Trading Administration* were planned in the various research projects and preparatory projects of the annual legislative programmes of the Chinese Government [45]. At present, the drafts of these laws are under deliberation.

2.2. Ratified and implemented conventions on the prevention and control of marine pollution

UNCLOS provides a legal framework that governs all the oceanic activities [46]. Part XII of UNCLOS namely ‘*Protection and Preservation of the Marine Environment*’ indicates that States have an obligation to protect and preserve the marine environment [47] including pollution from or through the atmosphere [48]. China has ratified UNCLOS on 15th May 1996. As a party to UNCLOS, China actively fulfils obligations of marine environmental protection and preservation, makes timely and effective responses to combat climate change and its impact on the oceans, which is evidenced in a series of laws, policy documents and actions. In the context of the 1972 London Convention and the 1996 London Protocol, measures to regulate marine geoengineering are also relevant, given the potential impact of some geo-engineering methods aimed at mitigating the effects of climate change on the marine environment [49]. China ratified this Convention in 1985 and issued the *Regulations on the Dumping of Wastes at Sea* and the *Measures for the Implementation of the Regulations on the Dumping of Wastes at Sea* [50].

The *Marine Environment Protection Law of the People's Republic of China* is a specific law aimed at directly regulating the protection of the marine environment. This law was enacted in 1982 and was revised four times in 1999, 2013, 2016, and 2017 respectively. While strengthening the control of pollution sources, the revised law pays greater heed to the governance of marine pollution and the protection of the marine ecological environment, which could enhance the ability to adapt to rising sea levels and prevent or minimise marine disasters [51]. In addition, the *Law of the People's Republic of China on the Administration of Sea Areas* (2001), strictly regulates any use that changes the natural condition of the sea areas [52], which should protect the coastal protection facilities from rising sea levels and enhance the ability of coastal area to cope with issues of climate change.

2.3. Responding international legal obligations on GHG emission reduction as regards the shipping industry

It is worth noting that the Kyoto Protocol primarily regulates GHG emissions from the land while the International Maritime Organisation (hereinafter IMO) manages the reduction of GHG emissions from international shipping [53]. The IMO has adopted the 1973 International Convention on the Prevention of Pollution from Ships and the 1978 Protocol [54]. As a party thereto, China is bound by these treaties. In recent years, a series of revisions have been carried out in the above-mentioned legal documents, and China rarely puts forward the objections [55]. An amendment of Annex VI of MARPOL 73/78 was passed by the IMO in 2011. China made reservations on corresponding clauses of the Non-Discrimination Principle, which apportions national responsibility [56]. This principle stipulates that all IMO's emission reduction systems and rules are equal and must be applied equally to all States [57]. The principle ignores differences on the subject of the GHG emission reduction of ships and the theory of justice of international responsibility in this field, which conflicts with the ‘Principle of Common but Differentiated Responsibilities’ [58].

In the Chinese domestic legislation, the *Regulation on the Prevention and Control of Vessel-induced Pollution to the Marine Environment* was issued in 2009 and revised in 2013, 2014, 2016 and 2017 respectively, which highlights the principle of prevention, and the combination of prevention and control as regards the prevention of marine environmental pollution from vessels and the relevant maritime operations [59]. The *Atmospheric Pollution Prevention and Control Law of the People's*

Republic of China (2015) also involves regulations on emission standards for ships. According to this law, motor-driven vessels shall not discharge atmospheric pollutants beyond the prescribed standards. It is also prohibited to produce, import or sell motor-driven vessels that discharge atmospheric pollutants beyond the prescribed standards [60].

2.4. Ratified and implemented the treaties concerning the conservation of marine biodiversity

Ocean warming and ocean acidification caused by climate change seriously threaten marine living resources and ecosystems, which are the main components of biodiversity on earth [61]. Consequently, the protection of marine biodiversity is a noteworthy issue while combating climate change and its impact on the oceans. According to Articles 61 and 117 of UNCLOS, States are required to conserve and manage marine living resources, which is also elaborated in the ‘Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea’ of 10th December 1982 relating to the ‘Conservation and Management of Straddling Fish Stocks’ and ‘Highly Migratory Fish Stocks’ [62]. Similarly, under UNCBD [63], States are also required to conserve and sustainably use marine biodiversity while contributing to enhancing ecosystem resilience [64]. As one of the first parties to ratify the UNCBD, China joined the Convention in early January 1993 [65]. In accordance with the requirements of Articles 6 and 7 of UNCBD, the Chinese Government issued *China's Biodiversity Conservation Strategy and Action Plan (2011–2030)* in September 2010 and established three priority areas for marine and coastal biodiversity [66].

Moreover, the 1980 Convention on the Conservation of Antarctic Marine Living Resources is a regional convention on the conservation of marine biological resources. The Conservation Committee of Antarctic Marine Living Resources was established under the Convention, which is a multilateral institution for the management of biological resources in the Antarctic Sea area. Ocean warming and the ocean acidification have seriously threatened the Antarctic marine organisms, and the Convention should play a greater role in addressing the threats posed by climate change to marine organisms. China joined the above Convention on 19th September 2006. The Convention came into effect in China on 19th October 2006. On 2nd October 2007, China formally became a member to the Conservation Committee of the Antarctic Marine Living Resources [67]. As a member, China actively promotes the construction of the Antarctic Reserve to strengthen the protection of Antarctic marine living resources.

3. China's policies and recent actions in combating climate change and its impact on the oceans

3.1. Relevant policy instruments

In June 2007, the Chinese Government issued *China's National Climate Change Programme*, which listed the coastline and coastal areas as one of the key areas to adapt the climate change effects. It was also proposed to enact and improve relevant laws and regulations as soon as possible, strengthen the marine environmental monitoring and early warning ability, and the sound adaptive countermeasures to deal with the rising sea levels. In the same year, the State Oceanic Administration issued *Comment on the Work related to Climate Change in the Marine Field* pointing out that it is important to fully recognise the significance of addressing the issues of climate change in the marine field and making clear the guiding ideology and basic principles of the work in combating climate change [68]. In 2008, the Chinese Government issued *China's Policies and Actions for Addressing Climate Change* pointing out that climate change has caused adverse effects on the coastal ecosystem and biodiversity. It is imperative to strengthen scientific monitoring of sea level change trend and supervision of marine and coastal ecosystem, rationally use coastline, protect coastal wetlands, build coastal

protection forest system, and improve the ability of coastal areas against marine disasters [69].

In 2012, the State Council approved the *National Plan for Marine Functional Zones (2011–2020)* and coastal provinces plans in this regard, making comprehensive arrangements for the development and environmental protection of maritime areas under China's jurisdiction [70]. In November 2013, *China's National Climate Change Strategies* was officially launched at the Warsaw Climate Conference, which includes three key tasks in adapting climate change and its impact on the oceans: Firstly, China should rationally plan the activities of marine-related development; Secondly, strengthen coastal ecological restoration and vegetation protection; Thirdly, strengthen the monitoring and early warning of marine disasters [71]. In September 2014, the Chinese Government issued *National Plan for Addressing Climate Change (2014–2020)*, which included measures to improve the ability of marine and coastal zones in adapting to climate change and proposals to speed up the establishment of a national carbon emissions trading market [72]. In October 2016, the State Council issued *Work Plan for Controlling Greenhouse Gas Emissions During the 13th Five-Year Plan Period* in order to boost green low-carbon development, ensure the completion of objectives and tasks of low-carbon development defined in the 13th Five-Year Plan Outline, and lay out a solid foundation for peaking carbon dioxide emissions around 2030 while striving to peak earlier [73].

In addition, the State Oceanic Administration formulated *Medium and Long-term Development Plans for Addressing Climate Change in the Marine Field (2011–2020)* and then issued the *National Oceanographic Observation Network (2014–2020)* in December 2014, which suggested that the sea was a key factor in global climate change. It identified that climate change intensified the rise in sea levels, extreme weather, and climate events. Consequently, it is imperative to strengthen marine observation in the sensitive areas, deepen understanding of global climate change, and improve the capacity of marine areas to cope with climate change [74]. The State Oceanic Administration released the *Plan on Promoting Marine Ecological Progress* expanding the scope of marine ecological redline regions and strengthening the restoration of marine ecology in coastal areas [75]. In December 2016, the State Oceanic Administration issued the *National Island Protection Work Plan during the 13th Five-Year Plan Period* pointing out that the protection of the island ecosystem is the main task of the island protection work when island regions combating climate change is becoming a global concern [76]. Presently, ten eco-island projects have been implemented in such provinces as Liaoning, Zhejiang, Fujian, Guangdong and Guangxi effectively strengthening island infrastructure for disaster prevention and alleviation. The ultimate aim is to cope with the effects of climate change [77].

3.2. Recent actions in combating climate change and their impact on the oceans

China continued with a positive attitude to play an essential role in advancing global climate governance and guiding international cooperation in addressing climate change and its impact on the oceans. China had made efforts to promote multilateral processes under the United Nations framework has introduced policies and actions in addressing climate change. On 30th June 2015, China submitted to the Secretariat of the UNFCCC, *Enhanced Actions on Climate Change: China's Intended Nationally Determined Contributions (INDC)* [78] explaining objectives, pathways and policy to adapt to climate change in a comprehensive manner. The INDC proposed to enhance resistance to marine disasters and management of coastal zones, and to improve the resilience of coastal areas against climatic disasters [79]. China made active efforts to put the Paris Agreement into effect and worked with all parties to promote the success of the COP23, which was held in Bonn in November 2017 in an open, transparent, inclusive, consensus-based and party-driven manner, which could further promote negotiations on the

work programme related to the implementation of the Paris Agreement, and accelerate ratification of the Doha Amendment to the Kyoto Protocol, so that it could enter into effect as soon as possible [80]. On COP23, Fiji proposed the *Ocean Route* initiative, which was designed to bring marine issues into agenda of UNFCCC ensuring that the Nationally Determined Contributions Programme (NDC) incorporates the marine issues into its action programme and strengthen cooperation of various marine-related activities and platforms [81].

It is pertinent to mention here that China has been actively involved in other multilateral processes of climate governance, such as participation in the negotiations on maritime GHG emissions reduction under the IMO making a great contribution to improving GHG emission reduction measures [82]. China also participated in climate change discussions such as the Major Economies Forum on Energy and Climate, the Petersburg as well as the informal discussion of achievements at the Marrakech Conference and the UN High-Level Conference on Climate Change [83]. China actively participated in relevant climate change negotiations and discussions under the Montreal Protocol, the International Civil Aviation Organisation as well as relevant climate change negotiations regarding international systems such as the Universal Postal Union and the International Organisation for Standardisation [84]. In addition, China extensively cooperated with international organisations such as the World Bank, the Asian Development Bank, the Global Environment Facility, and actively participated in relevant international conferences and initiatives [85].

China attaches importance to bilateral cooperation with other States in addressing climate change including strengthening exchanges and cooperation with developed countries. Since 2014, the Chinese Government has released joint statements on climate change with the United States, the European Union and the United Kingdom making significant contributions in promoting multilateral climate change negotiations [86]. In recent years, China has held meetings on bilateral cooperation mechanisms with a number of parties and States, such as the European Union, Australia, New Zealand, France, Russia, South Korea and Germany to exchange views on climate policies and actions, strengthen bilateral cooperation and consolidate cooperation mechanisms [87]. China has also promoted the South-South cooperation in combating climate change, which has strengthened exchanges and cooperation with developing countries and provided aids to many developing countries. China has signed a memorandum of understanding with 28 developing countries to donate materials for tackling with the issues of climate change. In terms of capacity building, a series of training workshops for the South-South cooperation on climate change was held to help relevant developing countries in training officials and experts in the field of climate change [88].

At the domestic level, China has strengthened the observation, early warning and emergency management of marine disasters in coastal provinces. The State Oceanic Administration promoted the construction of an ocean observing and forecasting system, carried out monitoring and assessment of the marine carbon cycle, and strengthened ocean forecasting and early warning provisions [89]. In addition, China has also enhanced infrastructure construction as regards disaster prevention and mitigation as well as climate change adaptation in island regions. Central special funds were allocated to repair some of the conservation projects. Wind-preventing, wave-preventing, tide-preventing, and coastal protection forest projects were constructed on islands in the areas of Jiangsu, Shanghai, Zhejiang and Hainan, which effectively improved island infrastructure and enhanced their capacity to cope with the issues of climate change [90].

The State Oceanic Administration preliminarily established a system for monitoring carbon dioxide exchange in offshore sea-air surfaces, enhanced marine disaster observation, warning and prevention and reduction approach. It also implemented sea level change monitoring and impact evaluation and monthly publishes the *Sea and China's Climate Outlook*. The State Oceanic Administration also more precisely forecasting the key guaranteeing targets in coastal areas, improved the

service system for guaranteeing marine fishing environment safety, and enhanced capacity building in marine disaster prevention. It publishes the *China Sea Level Bulletin* and *China Marine Disasters Bulletin* annually, and carries out marine disaster risk evaluation and zoning pilots at national, provincial, city and county levels [91].

In addition, China gained further experience from pilot projects involving carbon emissions trading. In December 2017, the National Development and Reform Commission of China (NDRC) issued a *Construction Plan of National Carbon Emissions Trading Market (Power Generation Industry)* [92]. To launch the national carbon emissions trading system and build a national carbon emission trading market, it is a major institutional innovation to control and reduce GHG emissions and promote green and low carbon development by a market mechanism [93]. During the National People's Congress & Chinese People's Political Consultative Conference in 2018, the Association of Industry and Commerce put forward proposals for legislation on the *Regulation of Carbon Emissions Trading*, for defining the attributions of emissions rights, obligations and legal responsibilities of trading entities, and implementing the regulatory authority of the regulators. These actions have greatly encouraged China's willingness in addressing the impact of climate change on the oceans.

4. Observations and recommendations

The key climate change indicators on oceans may include ocean heats, sea surface temperature, sea levels, coastal flooding, and ocean acidity [7]. China and the United States, the two world's largest emitters of GHG, who together accounts for nearly about 40% of global CO₂ emissions [95]. They can be the key player who can render their efforts to address the issues of energy security, global warming and climate change as a whole by cutting down the GHG emissions and energy consumptions. They jointly hold the key of sustainable climate or catastrophe in otherwise. However, they are not the alone responsible but the critical actors in these efforts. China has been contributing to purify the climate for the future generations by enacting various legal instruments at the local, provincial, national or international levels. Followings are the key findings, observations and recommendations of this study that will further assist the stakeholders to curb the environmental damages by the climate change:

- i. The adverse consequences of climate change on coasts, oceans, and Small Island Developing States (hereinafter SIDS) may be terrible and could not be reversible, which demands extreme precautionary measures to be adopted. It is also necessary to ensure the persistent oceanic functioning in order to regulate sustainability in overall climate, and to enable the SIDS communities to survive as well as boost their wellbeing. To this end, China should launch and adopt a precautionary approach to reduce GHG emissions while considering the population of the coastal provinces;
- ii. The establishment and effectively management of networks of marine protected areas can be one of the major ways to help in maintaining the environmental health, productivity and services in the face of climate change while decreasing poverty and protecting social and economic development in the country. Therefore, resilience of coastal and marine ecosystems should be ensured;
- iii. Properly regulating mitigation efforts while using the oceans could help in reducing the harmful effects of the climate change. Therefore, oceanic related mitigation measures should be carefully scrutinised and, if required so, should also be encouraged by the government of China to use suitable regulatory frameworks;
- iv. Carbon capture and storage has been recognised as high potential as a mitigation measure, so it should be wisely considered and controlled to make the practice more effective and safe;
- v. It seems that the ocean fertilisation approach is neither an effective one nor well regulated, which could pose severe results for the oceanic environment. Hence, it is vital to discourage this

approach;

- vi. Local or national authorities should encourage IMO deliberations concerning the limitation of air pollution from the ships;
- vii. Expansion of ocean-based substitute energy, e.g. ocean thermal energy conversion, tides, currents, and wind power should be alternatively fortified provided that protection of the marine environment and its resources be ensured by various appropriate regulatory frameworks;
- viii. Cost-effective protection against the threats from climate change can be achieved by preservation and restoration of the natural ecosystem, e.g. coastal ecosystems like coral reefs, mangroves, oyster reefs, and wetlands. These all help to protect natural shoreline from floods and storms. So, it should be consider by China while formulating plans for tackling the climate change;
- ix. The protection of coastal communities and other infrastructure should be ensured from the effects of climate change. A risk-based approach may be used in this regards through current incorporated ocean and coastal management institutions in China;
- x. To address the issues of climate change, adequate financing should be mobilised to meet the adaption as well as mitigation requirements of the oceanic or coastal communities in their perspective provinces;
- xi. Technology exchange and capacity development may be regarded crucial to prepare coastal communities with the volume for adaptation to climate change. It may also be helpful for organising and monitoring suitable mitigation measures using the oceans. China should priorities to capacity development of the population living in the coastal provinces in the adaptation of climate change;
- xii. The Chinese government should consider the public understanding to support and avoid the effects of climate change, which necessitates various adaption measures as well as abide by actions to limit GHG emissions. For this purpose, China should promote financing measures to educate, inform, and empower as well as encourage the general public to take personal and community decisions that lead toward a low-carbon sustainable future. [96]

5. Conclusion

The current task is neither to create new rules nor new institutions to solve new problems but to allow the existing legal and policy instruments to be effectively implemented. Concerted efforts are needed to promote the development of integrated, cross-sectoral and coherent approaches in addressing the effects of climate change and acidification of the oceans. In particular, there is a dire need to establish ways of enhancing coordination in the implementation of relevant and mutually reinforcing legal and policy instruments. States should make every possible effort to reach an agreement on acting on the ocean, before they consider initiating international litigation against the CO₂ emitter, in an effort to reduce the tendency towards the ocean acidification. The ultimate solution to avoid the worsening effects of climate change over the oceans is to reduce the emission of GHG worldwide. This will require actions at the international, national, local and community levels. It is also vital to safeguard the health of marine resources and the ecosystems. In addition, the resilience of marine species and ecosystem can be enhanced by reducing the stress of excessive human activity to foster long-lasting effects in combating the global climate change of the oceans [94]. To this end, China has sustained with an attitude of being fully responsible to promote international law in order to deal with climate change and its impact on the oceans. At the domestic level, a series of laws and action plans have been initiated with the focus of responding to China's international obligations, which will help to pamper the climate particularly in the region and the whole world at large.

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